National University of Computer and Emerging Sciences, Lahore Campus

Course:	Object Oriented Programming	Course Code:	CS1004
Program:	BS(Data Science)	Semester:	Spring 2022
Due Date:	24-5-22	Total Marks:	10
Section:	B & D	Weight	2%
Evaluation:	Assignment-03	Page(s):	2

Submission Path: Google classroom

Important Instructions:

- Submit only one **RUNNING** file as YourRollNumber.cpp that contains class, it implementation and the driver Program. **Do not submit .rar or .zip files**.
- No **Resubmissions** will be accepted so make sure you submit the correct files.

Question-01: Decryption of a message

In the human history cryptography has played a vital role during wars, by encrypting the war messages before sending them and then decrypting them on the receiving end.

The simplest of encryption can be done by shifting the letters of the messages by "n" (where n can be an integer between 1 and 25). Alphabets forward, **for instance "Hello" can be encrypted as "Ifmmp" by shifting its each letter to the right by one Alphabet.**

In the context of this Assignment you will be given a space separated string encrypted with **penta-shifting encryption scheme**, means that each letter will be shifted 5 letters forward.

An important thing to note is that if a letter such as 'Z' is shifted 5 letters forward it will take a turn around and be shifted as Follows

Z->A->B->C->D->E

You are a software engineer working for a Tech Company and have been assigned with a task to design a Decoder to decrypt the message encrypted by penta-shifting scheme.

Once you have designed the decoder, your company gives you description of two advance types of decoders with additional features.

1) Given Below is the Description of what decoder of each type offers

1) **Decoder**
   - Simply decodes the message and displays the output on the screen
2) **Super Decoder:**
   - Decodes the message and displays the output on the screen
   - Counts the number of words in the string
   - Counts the number of vowels and non-vowels
3) **Premium Decoder:**
   - Offers all the feature of Super Decoder in addition to displaying the decoded string in reverse order

You have been provided with a general structure of the classes to implement, it is now up to you to implement them correctly so they function as required.

```
//Note: You can add additional members to the class if required
class Decoder
{
private:
      string message;
public:
      Decoder(string)
      void Decode();
};

class SuperDecoder : public Decoder
{
public:
      SuperDecoder(string)
      void Decode();
};

class PremiumDecoder : public Decoder
{
public:
      PremiumDecoder(string)
      void Decode();
};
```

2) After you have designed the three decoders, your manager assigned you the task to design a single function that will accept a decoder object and offers the functionality of the type of Decoder Passed as the Parameter. To make your task easier he provides you with the following prototype:

```
void OperateDecoder(Decoder &Instance);
```

Happy Inheritance 😊